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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/821,639	03/29/2001	Narayan Venkatsubramanian	13223.010001;P5488	5721

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EXAMINER

VERBRUGGE, KEVIN

ART UNIT PAPER NUMBER

2188

DATE MAILED: 05/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/821,639

Applicant(s)

VENKATSUBRAMANIAN ET AL.

Examiner

Kevin Verbrugge

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 March 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-41 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-41 is/are rejected.
- 7) ☒ Claim(s) 19,21,27 and 28 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 March 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 2.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____.

DETAILED ACTION

Claim Objections

Claims 19, 21, 27, and 28 are objected to because of the following informalities:

In claim 19, line 2, "buffer" should be changed to --buffers--.

In claim 21, line 2, "process" should be changed to --processes--.

In claim 27, line 4, "process" should be changed to --processes--.

In claim 28, line 2, "process" should be changed to --processes--.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-4, 6, 8, 9, and 14-17 are rejected under 35 U.S.C. 102(b) as being anticipated by the admitted prior art (APA) of the specification and figures.

Regarding claims 1, 8, and 14, the APA of pages 6-8 and Fig. 3 of the specification anticipate the claimed method of transmitting a first message from a first process on a first node to a second process on a second node.

Fig. 3 shows the claimed first process on a first node as process 1 on node 2, for example. This process 1 defines a first process memory space on a second node, shown as allocated memory region 78 on node 1.

Furthermore, process 1 on node 2 assigns a separate postbox portion of region 78 for each process on node 1, as claimed, as indicated by the arrows connecting each postbox block inside region 78 to a separate process 1 to m on node 1.

Finally, when a message is too large to fit in a postbox, then process 1 “selects one of the buffer blocks from its allocated memory region (78), loads the message into that selected buffer, and stores a pointer to the selected buffer into the postbox that is specifically maintained for transfers between process 1 on node 2 (72) and process 2 on node 1 (70)” (page 7, second paragraph, first sentence) as claimed.

Regarding claims 2 and 9, the pointer stored in the postbox is a message indicator comprising location information of the first message as claimed, since it allows the receiving process to locate the message in the buffer pool (see page 7, second paragraph, second sentence).

Regarding claim 3, the second process polls its respective postbox and upon detecting the first message indicator, retrieves the first message from the buffer block in the buffer pool as claimed (page 7, second paragraph, second sentence).

Regarding claim 4, the first process determines whether the first message can be stored in the first process memory space by attempting to load it into a postbox. If it doesn't fit in the postbox, it is stored in a buffer block (see page 7, first two paragraphs).

Regarding claim 6, the APA's first process is capable of preparing a second message for a third process as claimed as indicated by the plural postboxes in memory region 78 (in fact the first process on node 2 is apparently able to send a message to each process on node 1 as indicated by the presence of a postbox within memory region 78 for each process on node 1).

The first process determines whether the second message can be stored in the first process memory space by attempting to load it into the postbox for the appropriate process.

Finally, if the message is too large to fit in the postbox, then process 1 "selects one of the buffer blocks from its allocated memory region (78), loads the message into that selected buffer, and stores a pointer to the selected buffer into the postbox that is specifically maintained for transfers between process 1 on node 2 (72)" and the third process (page 7, second paragraph, first sentence) as claimed.

Regarding claim 15, Fig. 3 does not explicitly show the claimed plurality of processors, but what is illustrated is several SMP nodes, each of which typically has plural processors (see page 1, second, third, and fourth paragraphs).

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Regarding claim 16, the claimed steps are not explicitly disclosed in the APA, however they are inherent in the APA as evidenced by the statement at the end of the second paragraph of page 7, where Applicant teaches that after a receiving process copies a message into its own memory, "the receiving process notifies the sending process that it can reuse the postbox for a future message." Inherent in this APA device are the claimed steps of determining whether an acknowledgement signal has been received, reclaiming a postbox associated with the message, and storing a new message in the postbox (reusing the postbox).

Regarding claim 17, in a similar way to claim 16, although the APA does not explicitly disclose the claimed steps, they are inherent in the APA device. Since a message may have been too large to fit in a postbox, a pointer may be stored in a postbox pointing to a buffer block. In this case, once the receiving process notifies the sending process that it can reuse the postbox, the buffer block would also be deallocated so that it can be reused as well.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 5, 7, 10-13, 18-21, and 31-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art (APA) of the specification and figures.

Regarding claim 5, the APA does not teach the first process determining that a first message cannot be stored in the first process memory space if it is larger than a certain number of bytes. The APA only teaches that if the message is too large for a postbox, then it is stored in a buffer pool the memory region allocated to the first process (region 78, for example).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to check whether a first message was larger than the buffer pool in the allocated memory region since having a message larger than the message storage area (buffer pool) would prevent a complete message transfer. This would either mean that some of the message would be lost since it wouldn't all fit, or it would have to be transferred in pieces (a complicating factor in design that would either be planned for or prohibited by not allowing messages of larger than a certain size).

Regarding claim 7, the APA does not explicitly disclose that the first process maintains a list of messages sent to other processes.

However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to maintain such a list so that the sending process would have a record of the messages it has sent and would be able to add information to the list regarding the various messages such as the time it was sent, whether its receipt was

acknowledged, etc., to assist in general message housekeeping chores and to ensure integrity of message transfer. One important motivating factor in maintaining such a list would be that once an acknowledgement had been received, indicating that the message had been successfully received and/or retrieved by the receiving process, the sending process would be able to proceed in its operations with the assurance that its message transfer had been completed. In the absence of such a list, tracking the status of multiple messages to multiple processes becomes difficult. A list provides a convenient data structure to maintain the data about all of the messages sent by a particular process.

In the APA, after a receiving process copies a received message into its own region of memory, "the receiving process notifies the sending process that it can reuse the postbox for a future message" (page 7, second paragraph, last sentence). This type of notification is what would be used by the first process to update the list of messages to indicate that a particular message was successfully received.

Regarding claims 10-13, the APA does not include the claimed list. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include such a list as discussed above. Furthermore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use such a list to locate memory space that was no longer needed (such as when notification is received that a process has successfully copied its message to its own memory) and could be unallocated in order to make room for another message. This process of using

a list to keep track of memory allocations was an extremely well-known concept and is virtually required in any system having a significant amount of memory if system operations are to be reliable and efficient.

Regarding claims 18-21, the APA does not include the claimed buffer count and receiver list. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include a receiver list to track the processes which still have unread messages and a buffer count to determine how many unread messages each receiver has. These features merely provide information about the receiving processes and whether they've read their messages or not, and keeping track of information regarding their message reading is an obvious technique of ensuring system reliability. Making sure each process receives each message sent to it is important and would obviously be included by the skilled designer who was creating a robust, reliable system.

Regarding claims 31-35 and 38, the APA creates and handles a data memory segment as claimed (memory region 78). The APA does not disclose the claimed acknowledgment segment, however this is analogous to the lists mentioned above and it would have been obvious to one of ordinary skill in the art at the time the invention was made to include this acknowledgment list for the reasons mentioned above.

Regarding claims 36 and 37, it would have been obvious to one of ordinary skill in the art at the time the invention was made to divide the acknowledgment segment (or receiver list) into various sections for the sending and receiving processes, so the sending processes could more simply access all of the acknowledgments from a single receiving process, for example.

Regarding claim 39, it would have been obvious to one of ordinary skill in the art at the time the invention was made to create an acknowledgment segment on each node so each group of sending processes would have its own acknowledgment segment for maintaining a list of the acknowledgments for all of the messages sent by the processes in its node.

Regarding claim 40, the type of connection between the nodes is a matter of design choice.

Regarding claim 41, clearly the first process can send a message to any process on any node.

Claims 22-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art (APA) of the specification and figures in view of U.S. Patent 5,613,068 to Gregg et al., hereinafter simply Gregg.

Regarding claim 22, the APA does not disclose transferring messages in pieces.

Gregg discloses a method for transferring data between processors on a network by establishing an address space for each processor in each other processor's memory. He explicitly teaches transferring messages in pieces at column 4, lines 31-32 where he says that "Each packet may be an entire message or response, or only a block (or piece) of the message or response."

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the APA to allow for messages having a size larger than that of the buffer blocks in the buffer pool shown in Fig. 3 inside region 78 since this would provide greater flexibility: messages would no longer be limited to the size of a buffer block.

The claimed steps of the method would then be obvious, namely once it was possible to have a message larger than the size of a buffer block (cyclic transaction size), it would be necessary to determine if a message is larger than the cyclic transaction size to determine if multiple message pieces would be needed. If the message fits in one buffer block, it would be stored in a single buffer block as claimed.

Regarding claim 23, similarly, if the message is larger than a buffer block, it would have been obvious to one of ordinary skill in the art at the time the invention was made to break it down into smaller pieces since Gregg teaches that breaking messages

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into pieces was well known and since doing so would enable large messages to be handled by the system.

Regarding claim 24, it is clear that the APA reuses buffer blocks (from page 7, second paragraph, last sentence), and it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a single buffer block for multiple pieces of the same message (since each buffer block is assigned to a single process and that process is receiving the entire message).

Regarding claim 25, the APA's buffer block size is the cyclic transaction size and this is the maximum amount of memory that can be used to send a piece of a message as claimed.

Regarding claim 26, the APA recovers allocated memory as claimed (see page 7, second paragraph, last sentence).

Regarding claim 27-30, neither the APA nor Gregg mention the claimed buffer count and receiver list. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include a receiver list to track the processes which still have unread messages and a buffer count to determine how many unread messages each receiver has. These features merely provide information about the receiving processes and whether they've read their messages or not, and keeping

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track of information regarding their message reading is an obvious technique of ensuring system reliability. Making sure each process receives each message sent to it is important and would obviously be included by the skilled designer who was creating a robust, reliable system. The claimed list operations are obvious functions of managing the list.

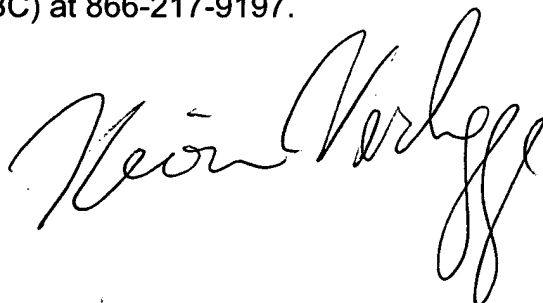
Conclusion

Any inquiry concerning a communication from the Examiner should be directed to the Examiner by phone at (703) 308-6663.

Any response to this action should be labeled appropriately (serial number, Art Unit 2188, and After-Final, Official, or Draft) and mailed to Commissioner for Patents, Washington, D.C. 20231, faxed to (703) 872-9306, or delivered to Crystal Park 2, 2121 Crystal Drive, Arlington, VA, 4th Floor Receptionist.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197.

Kevin Verbrugge
Primary Examiner
5/14/04

A handwritten signature in black ink, appearing to read "Kevin Verbrugge", is written over the typed name and date.